

CORRECTED VERSION

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
1 July 2004 (01.07.2004)

PCT

(10) International Publication Number  
WO 2004/055178 A1

(51) International Patent Classification<sup>7</sup>: C12N 9/30, 15/56  
// A23D 8/04, D06L 1/14, (C12N 9/30, C12R 1:645)

(74) Common Representative: NOVOZYMES A/S; Patents,  
Krogshoejvej 36, DK-2880 Bagsvaerd (DK).

(21) International Application Number:  
PCT/DK2003/000882

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(22) International Filing Date:  
16 December 2003 (16.12.2003)

(25) Filing Language: English

(26) Publication Language: English

(84) Designated States (*regional*): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(30) Priority Data:  
PA 2002 01928 17 December 2002 (17.12.2002) DK

(71) Applicant (*for all designated States except US*):  
NOVOZYMES A/S [DK/DK]; Krogshoejvej 36, DK-2880  
Bagsvaerd (DK).

Published:

— with international search report

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): TANG, Lan [CN/CN]; ZhiChun Road 57-1-707, Hai Dian District, 100080 Beijing (CN). WU, Wenping [CN/CN]; Room 103, Er Dan Yuan in Building #3, Yi Qu, Dong Li Xiao Qu, Shang Di Zone, Haidian District, 100085 Beijing (CN). DUAN, Junxin [CN/CN]; Zhi Chun Lu 57-1-707, Hai Dian District, 100080 Beijing (CN). JOHANNESSEN, Pia, Francke [DK/DK]; Haarbyvej 11, DK-2740 Skovlunde (DK).

(48) Date of publication of this corrected version:

7 October 2004

(15) Information about Correction:

see PCT Gazette No. 41/2004 of 7 October 2004, Section II

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: THERMOSTABLE ALPHA-AMYLASES

(57) Abstract: An isolated polynucleotide comprising an open reading frame encoding a polypeptide having alpha-amylase activity, the polypeptide selected from the group consisting of: a) a polypeptide comprising an amino acid sequence which has at least 70% identity with amino acids 22 to 450 of SEQ ID NO:4; b) a polypeptide comprising an amino acid sequence which has at least 70% identity with the polypeptide encoded by the amylase encoding part of the polynucleotide inserted into a plasmid present in the E. coli host deposited under the Budapest Treaty with DSMZ under accession number DSM 15334; c) a polypeptide encoded by a polynucleotide comprising a nucleotide sequence which has at least 70% identity with the sequence shown from position 68 to 1417 in SEQ ID NO:3; and d) a fragment of (a), (b) or (c) that has alpha-amylase activity.

WO 2004/055178 A1

# INTERNATIONAL SEARCH REPORT

Internat Application No  
PCT/DK 03/00882

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N9/30 C12N15/56 //A23D8/04, D06L1/14, (C12N9/30,  
C12R1:645)

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, BIOSIS, WPI Data, CHEM ABS Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	"Developments in industrial microbiology" A PUBLICATION OF THE SOCIETY FOR INDUSTRIAL MICROBIOLOGY, PROCEEDINGS OF THE THIRTY-SIXTH GENERAL MEETING OF THE SOCIETY FOR INDUSTRIAL MICROBIOLOGY, vol. 21, 11 - 17 August 1979, pages 327-337, XP002276036 Pittsburgh, Pennsylvania the whole document	1-16, 18-29
Y	---	10-17
X	WO 96 01323 A (DANISCO ;MICHELSEN BIRGIT (DK); RASMUSSEN PREBEN (DK)) 18 January 1996 (1996-01-18) the whole document --- -/--	1-29

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

5 April 2004

Date of mailing of the international search report

26. 04. 2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

YVONNE SIÖSTEEN / ELY

# INTERNATIONAL SEARCH REPORT

Internat Application No  
PCT/DK 03/00882

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 238 023 A (NOVO INDUSTRI AS) 23 September 1987 (1987-09-23) the whole document	1-9
Y		10-17
A	--- SANDRA L. TURCHI ET AL: "Improved purification of alfa-amylase isolated from rhizomucor pusillus by affinity chromatography" CURRENT MICROBIOLOGY, vol. 15, 1987, pages 203-205, XP002276037 the whole document	1-17
A	--- EP 0 184 019 A (HITACHI PLANT ENG & CONSTR CO ;HITACHI LTD (JP)) 11 June 1986 (1986-06-11) claims	1-29
A	--- DATABASE BIOSIS [Online] BIOSCIENCES INFORMATION SERVICE, PHILADELPHIA, PA, US; April 2000 (2000-04) PANDEY ASHOK ET AL: "Advances in microbial amylases" Database accession no. PREV2000000226835 XP002276443 abstract & BIOTECHNOLOGY AND APPLIED BIOCHEMISTRY, vol. 31, no. 2, April 2000 (2000-04), pages 135-152, ISSN: 0885-4513 -----	18-29

# INTERNATIONAL SEARCH REPORT

Information on patent family members

Internat

Application No

PCT/DK 03/00882

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9601323	A	18-01-1996	AU 3075295 A	25-01-1996
			WO 9601323 A1	18-01-1996
-----				
EP 0238023	A	23-09-1987	AT 98993 T	15-01-1994
			DE 3788524 D1	03-02-1994
			DE 3788524 T2	11-05-1994
			DK 135387 A	27-10-1987
			EP 0238023 A2	23-09-1987
			EP 0489718 A1	10-06-1992
			ES 2061446 T3	16-12-1994
			FI 871144 A	18-09-1987
			FI 20011797 A	12-09-2001
			IE 63169 B1	22-03-1995
			IE 940343 L	17-09-1987
			JP 3005618 B2	31-01-2000
			JP 7051067 A	28-02-1995
			JP 6065316 B	24-08-1994
			JP 62272988 A	27-11-1987
			JP 10276787 A	20-10-1998
			JP 2003153696 A	27-05-2003
			US 5766912 A	16-06-1998
			US 5965384 A	12-10-1999
			US 5863759 A	26-01-1999
			US 5874558 A	23-02-1999
-----				
EP 0184019	A	11-06-1986	JP 1660423 C	21-04-1992
			JP 3024197 B	02-04-1991
			JP 61115484 A	03-06-1986
			JP 1699123 C	28-09-1992
			JP 3065149 B	09-10-1991
			JP 61115491 A	03-06-1986
			DE 3582020 D1	11-04-1991
			EP 0184019 A1	11-06-1986
			US 4778760 A	18-10-1988
-----				